



Bad Vibes

Sound Insulation Enquiry

Teacher: Lesson:

Group: SEN students:

Date: Support Staff:

Room:

In this activity students will explore sources of noise pollution around them and devise and carry out an investigation into soundproofing materials.

Students will learn to:

- Plan and carry out a fair test enquiry to compare the effectiveness of different sound proofing materials.
- Construct a presentation to share findings with their group.

All students will be able to:

- Plan and carry out a fair test enquiry.

Most students will also be able to:

- Explain how and why key variables are controlled and interpret their data.

Some students will also be able to:

- Identify patterns in the data and use them to predict which other materials are likely to be effective sound insulators.

- 'Bad Vibes' programme
- alarm clock or mobile alarm – this should produce a sound at a constant level (one per group)
- boxes approximately 30cm square – one box should have the top covered with clear plastic and one end open so that metre readings can be taken (one per group)
- metre rule (one per group)
- sound meter or sound sensor and data logger (one per group)
- Selection of insulating materials for lining one of the boxes, including hardboard, plaster board, ceramic tile, various types of cardboard, paper and textiles – sufficient material should be provided so that students can control the thickness of the material in their enquiry. Some materials may need to be cut to size in advance, as it will not be safe for the students to do this.
- scissors for cutting the paper, card and textiles
- graph paper
- poster paper, pens and glue
- worksheet *Sound Insulation Enquiry*



Bad Vibes

Sound Insulation Enquiry

Starter (10mins)

1. Ask the students to make a list of the noises that effect them at home. Perhaps they wake them up or stop them from doing homework or watching TV. Give them three minutes to carry out the task.
2. Go round the class asking different students to give you one from their list.
3. Record each on the OHP or Interactive White board. Do not record examples more than once.
4. Discuss the outcomes of the brainstorm by asking the students:
 - Which sounds are produced by their family?
 - Which are produced by their neighbours?
 - Which are produced by other people?
 Underline and circle words accordingly to highlight each group.
5. Ask students for ideas to reduce the levels of these sounds in their houses.
6. Introduce the idea that Professor Trevor Cox is involved in carrying out research to identify ways to insulate homes against sounds from outside.

Main (85 mins)

1. Show clip from 'Bad Vibes' programme of Professor Trevor Cox describing how he tests ear defenders – stressing the difficulty of controlling the variables involved in this work.
2. Introduce the worksheet *Sound Insulation Enquiry*. Discuss with students the difficulties involved – the distracting effects of ambient sounds, the need to produce standard volume sounds for tests, the difficulty of measuring volume levels accurately. Demonstrate any equipment that will be provided for students but try to avoid simply giving students a 'recipe' for the investigation – leave them room to make their own decisions.
3. Students design and carry out an investigation into a selection of soundproofing materials.
4. Groups produce a poster to show their results, interpretation and evaluation.

Plenary (25 mins)

1. Ask three groups to present their enquiries to the whole class. Display posters for students to view after the enquiry. Encourage students to ask questions of each group.
2. Debrief the presentations by asking students:
 - How did they control variables in the enquiry?
 - How did they try to ensure validation and reliability?
 - What conclusions did they draw?
 - What points did they make in their evaluation?
3. Correct any misconceptions and summarise the outcomes of the enquiry and presentations. Emphasise key learning points with regard to design of enquiry, validation, reliability, and evaluation.

Answers to the questions

1. Accept any sensible suggestions, e.g. polystyrene foam, cotton wool, fabrics.
2. Accept any sensible suggestions, e.g. in a recording studio, around particularly noisy machinery, in a nightclub or concert hall.
3. Accept any sensible suggestions, e.g. using a recorded sound and always playing it at the same volume level through the same loudspeaker.
4. Accept any sensible suggestions, e.g. using a soundmeter or scoring sounds by ear (using headphones).
5. Answer drawing on students' own data.
6. Answer drawing on students' own data.
7. Accept any sensible answers backed up by explanations or evidence.